

REPORT of the Director of The Cooper Union

FOR THE YEAR ENDING JUNE 30, 1944

To the Trustees

GANO DUNN, *President*

ELIHU ROOT, JR.

WALTER S. GIFFORD

BARKLIE HENRY

IRVING S. OLDS

Pursuant to Section 5, Chapter XI, of the By-laws as revised June 20, 1938, the Director herewith submits the Annual Report on the conditions and needs of The Cooper Union in its several departments.

Part 1

THE EIGHTY-FIFTH YEAR of The Cooper Union coincided with the peak of the war effort which trained, equipped, and transported overseas six million men. As this academic year closed, the possibility of an early end of the European phase of the war seemed clearly discernible. In my annual report for the eighty-second year, written in the summer of 1941, I ventured to predict that the year then just concluded might be the last one for some time in which it would be possible to present the picture of a reasonably normal year, as all signs then pointed toward an increasing national effort to secure the defense of this continent and to aid the beleaguered

nations abroad. Three years later, I feel confident that we can look forward this coming year to peace and to the return home of a large proportion of the men in our armed forces.

This stupendous accomplishment is a tribute not only to the patriotic response of our citizens but to the state of the industrial arts which made it possible to invent as well as to produce airplanes, ships, and guns that were equal, and in many categories superior, to those of an enemy who for a quarter of a century had been preparing psychologically and industrially for world conquest. Our inventive and industrial achievements were made possible by our scientists, engineers, and managers. These men, who had received their early training and education in our American colleges, engineering schools, and universities, in that same period of twenty-five years developed processes and techniques of research and production which primarily were geared to a peacetime economy with peacetime objectives. Yet, when the national crisis arose, these men and their machines proved to be sufficiently flexible to develop the world's greatest arsenal. Thanks to them, we were able not only to supply the armies of the Allies with desperately needed war material but at the same time to equip our own army and navy. The leaders of the Axis nations must have been shockingly disillusioned as the "decadent" American democracy in three short years matched and even surpassed man for man and gun for gun their specially trained and equipped forces.

Educators are usually the first to be critical of their own efforts, and this tendency was never more manifest than now, when serious consideration is being given to postwar educational objectives. These educators are likely to overlook their own conspicuous part in the preparation of American youth to meet so successfully this second great call to arms in the first half of the

century. The dejected and spiritless youth of the depression decade of the nineteen-thirties seemed to some oldsters as hopeless as the gay and irresponsible youth of the nineteen-twenties. Even now national surveys reveal that our young people are deplorably ignorant of the rudiments of American history and politics. Jeremiahs throughout the land cry out against the gross vocationalism of higher education in general, against the decay of the liberal arts, against the predominance of varsity athletics, and against the inadequacy of the high-school system. Yet when the millions of men nurtured in American schools, colleges, and universities were put to the supreme test on the battlefield and in industry, they proved to be the equal of European or Oriental youth who had received Spartan physical training and mental regimentation under the banners of racial intolerance and national egotism. I believe that we, as educators, have been myopic in viewing the educational scene of the last quarter century. We have built better than we had any right to expect; and the military glories which deservedly are descending upon our youth are in part to be attributed to the education and training which they received at our hands.

I sound this note of satisfaction, based on the war-born evidence of the moral stamina and intellectual flexibility of our youth, only because there are at work in certain areas of American education influences which would cast out all that has gone before as wrong or at least inconsequential. Rather than yield to these influences, I would re-examine our American system of education; build on the strength which it has demonstrated; and correct the weaknesses which have crept in through conservatism, vocationalism, and a tendency to think of an education as the arithmetical sum of academic credits.

One of the most significant inventories of an important segment of American education, the education

of our scientists and engineers, is to be found in the report of a committee of the Society for the Promotion of Engineering Education on "Engineering Education After The War."* The studies of this committee were preceded by another committee report four years earlier on "Aims and Scope of Engineering Curricula." Taken together, they set forth both a philosophy of engineering education and a plan for achieving practical objectives.

The existence of these thoughtful reports needs to be more widely known. The American public is being unduly alarmed by liberal arts spokesmen** who fear the wartime emphasis on technical training. These alarmists warn that an undue burden of technical studies will exclude after the war the studies of man and human experience. These alone can inculcate concepts of the dignity and worth of the individual, of civic virtue, and of public service, and can preserve the integrity and moral health of the republic. It should be reassuring to the uninformed to learn that engineering educators have set up two coordinate "stems" of educational growth extending through the engineering curriculum—the scientific-technological and the humanistic-social stems—with the aim of developing informed, thinking citizens as well as efficient engineers. The very existence of these two "stems" in the curriculum requires the closest possible integration in the academic development of the student. For example, the teacher of science and engineering must not only be aware of the student's defects in the arts of expression, but be sufficiently interested to give whatever aid he can and to see to it that the help of other teachers specially trained to cope with such matters is enlisted. On the other hand, the teacher of the arts and humanities must be vitally aware of the

* *Journal of Engineering Education*, 34: 589-614 (May, 1944).

** Howard Mumford Jones, "Citizen or Mechanic," *Saturday Review of Literature*, 26: 3, 26 (September 18, 1943).

nature and significance of the technological applications of science.

The undergraduate engineering school of tomorrow aims to have students enter upon their careers with an attitude and background appropriate to effective citizenship as professional men, and to have them acquire better than average skills in written and oral expression as well as a sustaining interest in the common welfare and in the cultural aspects of community life.

It is quite beside the point to argue that as part of the postwar educational adjustment there will be a shift from wartime student interest in science, mathematics, engineering, and technical fields to the liberal arts and social studies. It is not a matter of "either-or," but of "both." That is to say, the engineering schools are recognizing the necessity for balancing their curricula with the humanities, and probably the liberal arts colleges should consider balancing their curricula with some studies of the nature and effect of science and technology upon human society. There are too many sentimental humanists of our day who would retreat from the challenge of science. Both liberal arts colleges and engineering schools should aim to give meaning and significance to science and technology in relation to the larger concepts of the humanities and philosophy.

Furthermore, there is no more dangerous or mistaken idea than that expressed in the catch-phrase, "It doesn't make much difference what a man believes; it's what he does that counts." Whether our youth enter life from the high school, the engineering school, or the liberal arts colleges, we must remember that their actions will be determined by their beliefs and that their beliefs will be modified by their actions. The man who believes that his life is just an accident in time, and that moral values are merely subjective and trivial and hence may

be ignored when he finds it convenient to do so, is following a path which will lead to defection from his ideals when they interfere with his personal advantage. The educational system, therefore, has an inescapable responsibility in the preparation of youth, both morally and spiritually, for the conflicts, temptations, and tensions of life.

When the Church had the sole responsibility for education and the western world accepted its teachings without dissent, moral philosophy pervaded the curriculum and there was no problem as to agency or subject matter. In more recent times, as schools and colleges became public and non-denominational, education became secularized and standards of conduct no longer were presented from a religious point of view, however much they might be shared by a variety of faiths. As this change came about, the moral basis of education weakened. One of the great problems facing modern education is the finding of a strong and socially satisfying ethical foundation for its functions. Educators such as Meiklejohn* are seeking this in moral sanctions resting on the demands of a society based upon the brotherhood of man.

There is current in learned circles today a specious notion that truth is to be sought and found only through and by the scientific method, commonly associated with the natural sciences. This method of quantification and measurement when applied to inert or even living matter has yielded amazing results. The scientist appears to have found the keys that unlock the secrets of nature. But that is not to say that he has necessarily found the keys that unlock the secrets of human nature or that he

* Alexander Meiklejohn, *Education Between Two Worlds* (New York: Harper and Brothers, 1943).

ever will achieve in the field of human values the sharp, clear-cut findings of mathematical physics. The storehouse of human knowledge and experience to be found in the great writings of history, literature, and philosophy will not be unlocked by chemical analysis, X-rays, or the calculus.

The difficulty seems to have been that instruction and discussion in the realm of human and spiritual values has been largely confined to the level of higher education and to the so-called liberal arts field. There can be no greater crime against American education than the continuance of this isolation of the humanities from the great mass of our youth unless they enroll in a liberal arts college. The humanities and their "scientific" counterparts, the social sciences, should be brought into the curricula of the high school, vocational school, junior college, technical institute, and engineering school. However, the mere exposure of students to the hundred great books is not sufficient. The purpose of introducing these subjects must be understood and endorsed by faculties and students. Some leaders in the field of engineering education have gone on record as saying that as much as one-fifth to one-fourth of the engineering curricula should be devoted to the socio-humanistic stem. If these clear-thinking, broad-minded executives, in close touch with the needs of industry, can see the value of this branch of learning in coordination with science and technology, then other educators should be prepared to add it to other fields of vocational training. Thus there may be opened for the mechanic, tradesman, and housewife, in their youth, those long vistas of beauty and wisdom which are to be found in the humanistic-social studies.

The point of view of the enlightened scientist and engineer who sees himself as a responsible member of society is well stated by Gaston F. DuBois, who, in

accepting* in January, 1944, the Perkin Medal for outstanding work in applied chemistry, said:

Our present era is characterized by something new in the life of man, and that is the impact of science and of applied science or technology on our lives. However, our ultimate goal is not science, just for science's sake, but a higher degree of culture and civilization. We should realize that science is not the measure of civilization—science and technology are merely tools, not ends in themselves

Science must be blended with a recognition of moral principles and those principles must be properly applied. Therefore, if scientists and technologists are to play a greater part in the world of tomorrow, they must accept wider responsibilities which will take them out of their laboratories and plants and into the life of the nation. Do the technicians of the world fully recognize these obligations? If so, what are they doing to meet them? How will they apply this torrent of new knowledge?

There is much merit in the current advocacy of compulsory military training for all able-bodied youth, both as a health measure and as a means of assuring the readiness of a large body of trained men during a chaotic postwar world situation. Yet there should be another innovation in our postwar measures for the preservation of world peace, and that is the indoctrination of our youth with the will as well as with the might to keep that peace. Neither the international machinery nor the mightiest navies and armies will avail unless the peoples of the world are determined that peace shall prevail. This indoctrination can best be achieved through the study and discussion of the humanities as the lowest common

* Gaston F. DuBois, "The Chemist Steps Out of the Laboratory," *Industrial and Engineering Chemistry*, 36: 134-137 (February, 1944).

denominator which can cut across religious, racial, and national cleavages. Without some such efforts on the part of American education, the years of compulsory military training might well turn out to be a brutalizing experience conditioning our youth to a highly authoritarian society, which would be the worst possible initiation into citizenship in a democracy and in a world where force is, we hope, to be renounced not only by word but by deed.

Whether or not the year of military service terminates the formal educational experience of the majority of our youth (those who do not go on to college), we should look forward to a great extension of adult education throughout the country. The postwar military plans apparently include a period of service of ten years or more in the reserve army, which would probably provide military refresher courses as well as continued drill and instruction in the home communities of the reservists. The habit of going to school may be expected to catch on with our younger adults under such circumstances. "Going to school" one night a week in the local armory may engender the desire to go one night a week to the local public school, where teachers specially gifted and trained in adult teaching will offer thrilling opportunities to non-college youth to explore literature, languages, history, and social sciences. Furthermore, other areas of human knowledge such as astronomy, biology, geology, or plant, animal, and bird study may add information which could provide the basis of lifelong hobbies and interests.

Perhaps the first step in advancing the general program of adult education is to dispel the notions entertained by the adults in the community that the program is dilettante or that the regimentation which they experienced in high school will prevail. Adults must expect and must find a congenial atmosphere of inquiring minds

assembled under enlightened leadership to pursue or to explore cooperatively a subject of common interest. Conventional hour periods of instruction may expand into whole evenings or weekends. The place of instruction may be an ordinary classroom, a neighborhood community house, or a branch library. The leaders of instruction may be college trained and accredited, or they may be men and women who through personal interest and activity have acquired knowledge and developed skills which have so inspired them that for the sheer joy of it, they want to share their enthusiasm with others.

We must get over our formalism in education and our janitor complex with respect to our school buildings. As the need for intelligent use of leisure time becomes more evident to a community, citizen tolerance of the precious, hands-off attitude toward the physical plant and teaching staff of the public schools will be modified. Adults will demand the right to use the schools after the conventional daytime hours and insist on the appointment to the teaching staff of a few special teachers who will be assigned exclusively to the stimulation, coordination, and administration of adult education.

The vocational aspects of adult education have been disparaged partly because they have been associated with skills usually taught in high school, such as stenography, typewriting, bookkeeping, or commercial letter writing. Actually there is much adult instruction carried on at a high technical and professional level. For young adults who find themselves misplaced or stalled in industry or business and wish to retrain or upgrade themselves, a relatively new unit in our educational system promises to be rapidly multiplied and expanded during the postwar period. The technical institute, often referred to in industrial areas as a mechanics' institute, fills an important need by offering evening as well as

day courses at the sub-college level in mathematics, chemistry, physics, and electricity, as well as in the elements of engineering. However, the technical institute should never be regarded as competing with or jeopardizing the degree-granting engineering schools. The two types of schools are entirely separate and distinct as to aims and objectives.

The counterpart of the technical institute at the professional engineering level is the evening engineering course for adults. In the larger metropolitan areas such courses have been available for many years. As there may be a rapid expansion of off-campus instruction by state colleges and universities, especially in graduate courses, duplication and competition of extension units becomes a possibility. This would be unfortunate, for faculties of distinction and scientific laboratory equipment cost heavily. To meet reasonable standards, the per capita student cost would have to be raised to a point where tuition fees would bear a very small proportion of the outlay. The taxpayer will not view calmly a situation where more than one properly constituted public agency attempts to render service in this area of higher education.

Even privately supported institutions in any one locality may eventually reach a point where the overlapping of fields of advanced instruction will have to be eliminated. Already traditions or reputations building up around certain of these institutions as excelling in geographical studies, social studies, medicine, law, and so on indicate a trend toward differentiation.

Perhaps one of the greatest aids to adults seeking professional courses would be a central guidance office maintained jointly by the colleges and technical schools of a given area to give advice as to where to go to study the various advanced and special fields.

For the community as a whole, group activities stemming from adult education centers will do much to counteract aimless leisure-time activity. So eminent a scientist as Harlow Shapley, Harvard astronomer, says* that it is high time we got started on a program of deliberate cultivation of community life, and suggests that local science clubs interested in biology, topography, and archaeology foster pride in the community. He adds:

Before long, some particular county or valley is going to be proud, for instance, that the herbarium of that county or valley is excellently known and has been related to the flora of larger regions and to the community's horticultural and agricultural problems. The rise of small symphony orchestras and choruses and the growth of amateur musical performance are signs that we can develop genuine loyalties to the striving home folks, and really enjoy them, notwithstanding the perfection that could be ours by the turning of a dial [of a radio]. These musical movements, especially when they can be related to the folk songs and the folk lore of the community, are a responsibility for all of us who recognize the dullness of perfection, the importance of the independent life of the community, and the heightened likelihood of the evolution of taste and intelligence.

The Cooper Union approaches the postwar period in a spirit of confidence and adventure—confidence that our eighty-five years of evening instruction in the sciences and technology have given us the tradition and experience to continue to contribute to the educational resources of the community; confidence that our program in art education has schooled our graduates in the funda-

* Harlow Shapley, "Social Duty on a High Level," *Think*, 10: 10-12 (July, 1944).

mentals of the fine arts and not turned them out as craftsmen trained only to meet the demands of passing fad or fashion; confidence that we have learned how to serve the public seeking inspiration and ideas in the decorative arts; confidence that our work in adult education, though timely, is not superficial. We have a sense of adventure in the projects under way to improve our teaching methods in the sciences and technologies, combining the best pedagogical theories with those skills and teaching aids developed in current war training courses; adventure in continuing our quest for common meeting grounds for the arts and sciences so that our graduates will not go out as narrowly trained specialists in either field; and, finally, adventure in the assurance that our personnel, including Trustees, officers, and teachers, are imbued with the experimental and inquiring spirit of our founder, Peter Cooper.

Part 2

Academic and Administrative Changes

Irving S. Olds, Chairman of the Board of the United States Steel Corporation, was elected a trustee of The Cooper Union in May, 1943, to fill the vacancy caused by the death of J. P. Morgan on March 13, 1943. Sheridan A. Logan was elected Treasurer of The Cooper Union in May, 1943.

Upon the resignation of Harry W. Reddick, Professor of Mathematics, on October 1, 1943, Frederic H. Miller, Associate Professor of Mathematics, was promoted to the rank of full professor in charge of the department as of that date.

Kenneth C. Reynolds, formerly Associate Professor of Hydraulics at the Massachusetts Institute of Technology, was appointed Head of the Department of Civil Engineering upon the resignation of Edward S. Sheiry, June 30, 1944.

Leaves of absence were granted to the following members of the staff who entered the armed forces: D. Graeme Keith, October 18, 1943; Harold Lancour, August 21, 1943; David K. Maxfield, March 14, 1944; Albert Radoczy, November 30, 1943.

At the close of the year, normal retirement age had been reached by John R. Safford, Superintendent, completing 33 years of service; John Carlson, Porter, completing 34 years of service; I. Lazdon, Porter, completing 17 years of service; and J. P. J. Williams, Instructor, completing 23 years of service. Consequently, these employees retired on June 30, 1944, with pensions, in accordance with the provisions of the Retirement Plan.

To these faithful employees of The Cooper Union go our best wishes as well as the hope that they will find well-earned rest and enjoyment in their new leisure in the years to come.

The following promotions were made, effective July 1, 1944: in the Department of Electrical Engineering—Ernest W. Starr, from assistant professor to associate professor; in the Buildings Department—David D. Thompson, from assistant superintendent to superintendent.

Enrollment for the academic year 1943-44, as of September 30, 1943, was as follows: Engineering Schools: Day—203, Night—342; Art Schools: Day—166, Night—310. The total, 1,021, may be compared with the enrollment for the previous year, on September 16, 1942: Engineering Schools: Day—336, Night—660; Art Schools: Day—181, Night—397; total—1,574.

The educational and administrative activities of The Cooper Union have become a theme of perennial national interest. The number of clippings received from July 1, 1943, to June 30, 1944, was 2,941. Publications in forty-eight states and one Canadian province carried Cooper Union news.

In order to reduce the size of the Annual Report in conformity with Government requests for conservation of paper, the departmental and divisional reports will not be published this year. It is unfortunate that the following running comment is too brief to do justice to the members of our hard-working and loyal staff and to their leaders.

In general, it may be said that the year just concluded was characterized by academic and administrative adjustment to changing war conditions.

The special services set up in 1941-42 and reviewed in the last Annual Report were created to meet needs arising out of the impact of the war on the internal administration of the institution and on its student body. They have now been reduced to skeleton form. For example, it seemed to be no longer necessary to keep the air raid protection program at full strength, though the experience gained will be used in perfecting a permanent system of fire drills and fire protection. We were permitted to remove the blackout paint from our Art School skylights and from other areas, which improved operating conditions.

The Engineering, Science, and Management War Training Program which was authorized at The Cooper Union in August, 1942, was limited this past year to only one course. A course in Elementary Engineering Optics was offered over a period of twenty-eight weeks. It was given for the purpose of affording workers in optical manufacturing companies of the New York area an opportunity, not to be found elsewhere, to acquire a basic knowledge of the fundamental principles of optics combined with laboratory and shop instruction and practice. The course was based as nearly as possible on the needs of workers in optical manufacturing plants. It stressed the fundamental physical principles which could be applied to such operations as the grinding, polishing, and inspection of optical parts, resulting in fewer rejected parts and in a greater understanding of the manufacturing operation in terms of physical principles rather than rules. Students were encouraged to bring to class and laboratory specific problems involved in their work. An important innovation in the course was the attention given to the operation and physiology of the eye, the importance of which in the successful design and operation of optical instruments as well as in inspection procedures is obvious.

In the last Annual Report was noted the failure of the War Department to install an Army Specialized Training Program unit in The Cooper Union in the summer of 1943 on account of lack of housing facilities at rates the Army felt it desirable to pay. As The Cooper Union had done everything it could to cooperate with the Government, and had spent time and energy in laborious preparation, we were disappointed in not being able to participate in this phase of the war effort, until it became evident that changes in basic Allied war plans eliminated the possibility of long-range training programs for scientific and technical personnel. In December, 1943, all army-supported courses in colleges were marked for drastic curtailment and the ASTP in approximately two hundred colleges in the United States was reduced, during the academic year, from a peak of 145,000 in January, 1944, to 1,000 in June, 1944.

Engineering and Art

The day courses in our School of Engineering had been put on a four-quarter basis in February, 1943, in order to synchronize the program of our remaining civilians with that of the army students expected to arrive during the spring or summer. Although the army program did not materialize, we decided to retain this arrangement through the fiscal year 1944-45, because of the advantages accruing to students who would later be drafted. The evening engineering courses as well as the day and evening art courses remained on a two-semester basis.

In order to ensure an enrollment of reasonably adequate size for the day engineering courses, the Faculty of the School of Engineering recommended to the Administration that admission be limited to those whose age or physical status would assure the completion of at least four academic quarters of instruction under

existing Selective Service regulations. Accordingly 50 boys and 2 girls were admitted in March and 71 boys and 1 girl were admitted in June, 1944, to the day courses in the School of Engineering—24 per cent more than our normal yearly admissions. Thus the facilities of our School of Engineering were used to about 45 per cent of its day capacity, with classes of about normal size in the basic scientific block of studies.

Only 100 freshmen were allowed to enter the evening courses instead of the customary 200 because of the smaller number of qualified applicants. Selective Service regulations were such that men under 26 years of age were eligible to deferment only if they were in certain very special categories of critical occupations. Therefore our enrollment in the evening engineering courses dropped from a prewar normal of 850 to 212 in June, 1944, or to about 25 per cent of normal capacity.

Our Department of Humanities has been experimenting successfully since 1939 with the integration of socio-humanistic studies with the curricula of the Schools of Engineering and Art. It is now offering a sequence of subjects which, taken as a whole, should give our graduates some perspective on the history of western culture and some appreciation of their roles as citizens and individuals. Complementing their professional studies, this results, for the engineers, in an appreciation of the humanities, including esthetics; for the art students, a sense of the implications of science and technology for the materials with which they work and for the interpretation of human society which they may attempt in their creative and philosophical moods.

It is hoped that this phase of our educational process will expand to meet its ever-growing importance. We always keep in mind that lectures, discussions, and trips to the Museum are merely means and not ends in

themselves and we know that man does not acquire culture as he would put on a new suit of clothes. However, we do believe that we can add to the general cultural development of the students of engineering and of art at the same time that they are concentrating on facts, theories, and vocational skills in the all-too-brief period of undergraduate instruction. The professional world of engineering and art properly demands a breadth and depth of preparation and a certain sophistication which cannot be gained by conventional classroom routines. Ingenuity, resourcefulness, and thoroughness in the presentation of humanistic studies, offered as a designed sequence and a coherent pattern over the whole undergraduate program, are the answer to the skeptic who says that the engineering student is not interested in anything but his profession and that the art student will not study anything but his craft.

Bridges between engineering and art continue to be sought at The Cooper Union. Members of the Department of Machine Design of the School of Engineering gave lectures to students in the Industrial Design group of the Art School on the design and preparation of materials for mass production. Teachers of Industrial Design discussed with students in the Machine Design group current problems of the industrial designer with special reference to the part that form, line, color, and convenience play in creating "mass appeal" for mechanical and electrical apparatus. Certain lectures covered the selection of suitable motions, the proper design of the various members, and the processing methods of manufacture, as well as the economics of mass production. Joint participation of civil engineering and architecture students in an introductory course in town planning, zoning, and housing followed the pattern of previous years in which staff and students in our two divisions of engineering and art continued to discover common

areas of interest and to seek aid, stimulation, and inspiration of one another. Thus they arrive at a better understanding of their subject than if they had pursued it in the conventional water-tight compartments of academic isolationism.

Enrollment in the day classes of the Art School held up remarkably well, with 107 students still with us at the end of the year who are planning to continue their studies in the fall. This group, with an incoming class of about 70 in September, 1944, will enable us to operate next year at about 80 per cent of normal. Two hundred and eleven students enrolled at the end of the year in the evening courses expect to re-register this fall. These, and an incoming group of 175 students, will enable us to operate the evening art courses at 72 per cent of normal next year. Several changes in the staff were brought about by the war. On the whole, the student body, in which girls were in the majority, had a profitable year, although the distracting influences of war were not without their effect upon attendance and upon continuity and intensity of effort.

In September, 1943, the day courses were modified for completion in three years instead of four, although the senior classes of 1944 were permitted to complete a four-year course to graduation. Certificates of graduation were also awarded to the juniors completing a three-year course in May, 1944. Architectural students in the day course are permitted the option of continuing a fourth year of study in the evening course in technical subjects not now included in the Day School curriculum, such as Architectural Practice, Architectural Construction, and Building Equipment.

The Annual Exhibition of student work was opened to the public on May 24, 25, and 26. Novel features, favorably noted by many of our visitors, in-

cluded several life-size display figures in papier-maché, ingenious mechanical toys, and costume jewelry in fresh combinations of wood and metals. The Exhibition also included drawings, paintings, advertising, costume designs, photographs, architecture, window displays, furniture, and sculpture. A summer exhibition of student work was hung in Room 610 for the benefit of applicants and visitors.

The Advisory Council of the Art School had a busy year under its chairman, André Fouilhoux. It held several luncheon meetings with groups of the teaching staff to discuss special areas of interest such as painting, architecture, and advertising. It is expected that these meetings will continue under the leadership of the new chairman, Richard Bach, Dean of Education at the Metropolitan Museum of Art.

On September 3, 1943, bachelor's degrees were conferred upon 48 graduates of the day courses of the School of Engineering by Gano Dunn, President of The Cooper Union, who handed each student his diploma during an informal reception in the Students' Library. This was the second group to be graduated from the day courses under the accelerated program.

Twenty-seven certificates in the evening courses and 42 certificates in the day courses of the Art School were awarded at a brief ceremony in the Library on the opening night of the annual Art School Exhibition, May 24, 1944.

On June 15, 1944, at an informal commencement held in the Great Hall for the School of Engineering, 37 bachelor's degrees were conferred on graduates of the evening courses and 42 bachelor's degrees on graduates of the day courses. Nine alumni received professional degrees for outstanding achievement in the engineering profession.

Green Engineering Camp

The Green Engineering Camp had a successful year with 2,376 "camper days," made up of 122 days in camp spent by 33 groups composed of 491 students and 88 staff members. Twenty-nine of these groups were self-initiated and spent a total of 1,078 "camper days" during the year. This shows an increase over the year before, when 24 groups, composed of 403 students and 70 staff members, spent 94 days in camp. Three periods of formal instruction or activity sponsored by The Cooper Union included an Orientation Camp weekend for the freshmen over the holiday of the Fourth of July, 1943, and a two weeks' landscape painting course for 29 Art School girls in June, 1944, followed by a two weeks' survey practice course for 14 students of civil engineering.

It is gratifying to note that in spite of limitations and difficulties resulting from rationing and food problems, there is a growing realization on the part of students of the excellent facilities afforded by the Camp for brief rest and recreation periods.

The continued interest of Norvin Hewitt Green and his visits to the Camp are very much appreciated. Last January Mr. Green generously made an offer, which has been accepted, of an additional tract of about 170 acres. The acquisition of this tract will increase our camp property to about 1,000 acres.

The new tract will give the Camp a desirable road boundary to the east, and will more than double the property line along the New Jersey-New York state line, which now includes the accurately determined twenty-mile stone and the corner stone of Orange, Rockland, and Passaic Counties. Approximately three thousand feet of the Camp's property line will now coincide with the state line and the new acreage will round out the Camp area

to include land adequate for any future use contemplated for the Camp.

Student Health

The Student Health Service in The Cooper Union differs from many typical college programs because of the absence of students-in-residence and also because of our proximity to abundant specialized medical services. Diehl and Shepard have stated the philosophy behind a student health service as follows: "The student should be presented the opportunity in college to learn how life may be prolonged and efficiency improved by establishing the practice of healthful living, and by demanding competent standards of medical care and community health protection."* While the practice of healthful living is a desirable goal in both metropolitan and rural student groups, there is a fundamental difference in approach.

Most colleges in small communities, especially those with students living on the campus, must supply all the facilities for medical care, including a full-time medical staff and infirmaries as well as medical, dental, and optical clinics. Because of our location in the midst of unusually adequate facilities and the absence of resident students, our Student Health Service has been based upon educating the student in the use of facilities already existing in the surrounding community. This technique should be more effective in establishing habit patterns and knowledge which can be transferred directly to post-college life in the community.

Our educational technique has been based upon thorough, compulsory physical examinations designed to discover physical defects amenable to correction. Then, through advice given in a series of follow-up inter-

* Harold S. Diehl, M.D., and Charles E. Shepard, M.D., *The Health of College Students* (American Council on Education, 1939), p. 6.

views, the student is taught how to care for his own health problems with the facilities available. Some cases are completed with the advice given during the examinations. Many are referred to appropriate off-campus medical services, while others are referred to our physical education department for corrective exercises. In no case is free medical treatment given by the school physician.

Our plan has the advantage of utilizing the interest of the student in his personal difficulties rather than of trying to educate him along the lines of general health procedures, many of which he may never need. It tends to promote rather than compete with existing facilities. Its disadvantages are the high cost per student of individual instruction and the variation in the amount and kind of health training offered to each student.

This procedure exemplifies the trend toward preventive medicine which has been accelerating in recent years. In an editorial on January 29, 1944, the *New York Times*, discussing this trend, praised The Cooper Union for its foresight in instituting its preventive student health service and commended its procedure of cooperation with family physicians and other off-campus medical services.

Adult Education

The Division of Social Philosophy completed its first decade this year. At such a time, it is with considerable pride that we quote the distinguished leader in adult education, Dr. Paul H. Sheats, now head of the lecture division of Town Hall and formerly director of "New Tools for Learning," an educational project supported by the Alfred P. Sloan Foundation, as follows:

Cooper Union Forums are a significant achievement in adult education in the United States. I do not

know of any forum center anywhere in this country that sustains as good a program week in and week out, over a period of months. Your Forums are making an especially important contribution during these war years, for you are demonstrating your faith in one of the basic traditions of our whole democratic system, namely, the right of the people to discuss their own common problems freely and openly.*

The writing of the history of The Cooper Union platform has just been initiated as a piece of research at Columbia University to serve as a reflection of American social and intellectual history. Some 4,000 lectures have been given in the Great Hall since 1868. These have been sponsored variously by The Cooper Union, the Board of Education, and by Columbia University up to 1898, when the People's Institute shared the platform with Columbia University. In 1934, the Department (now Division) of Social Philosophy took over, and since then some 700 meetings have been held under its auspices.

Seventy-eight meetings with a total attendance of about 70,000 persons were held last year under the able leadership of Dr. Houston Peterson. These programs, which were given on three evenings each week, dealt with topics pertinent to the times we live in, yet were not solely restricted to those of headline interest. Lectures grouped under the general headings of *The Drama of History*, concerned with the great issues of international alliances, leagues, and federations, comprised the first half of the Sunday series. The second half continued the same global theme with a discussion of countries and cultures—what Mencius called “the common heart of man.” The Tuesday series, which started under the caption of *Rough Sketches of the Future* and ended with

* Speech at The Cooper Union Forum, April 4, 1944.

the cryptic title *Mind Your Own Business*, was devoted to numerous public issues which the ordinary person is likely to consider outside the circle of his proper interests.

The first half of the Friday series was devoted to the peoples and problems of Africa and presented a veritable "Who's Who" of authorities on Africa, several of whom were distinguished Negro speakers. As a result of a nation-wide poll conducted by the Schomburg Collection of the New York Public Library, this course of fourteen lectures won for The Cooper Union Forum a place on an Honor Roll containing the names of only six white persons or institutions having contributed the most to the improvement of race relations during the past year. Perhaps our boldest experiment in many seasons was the giving over of the entire latter half of the Friday series to the consideration of a single book, *The Republic*, by Charles A. Beard. Our modest program of four extension courses was highlighted by a beautifully urbane series of sixteen lectures by John Erskine on "The Complete Life."

The Library

The year just completed was the first in which the Library had sole charge of all books and reference materials. The consolidation of divisional libraries, started in 1938, was completed with the annexation of the Encyclopedic Pictorial Reference Library in July, 1943. Although two changes in the chief librarianship occurred during the year because of inductions into the armed forces, the service to the public and to the student body was effective. The restoration of a former public service met with much enthusiasm. A file of fifteen out-of-town newspapers was installed, back issues of which are kept for three-month periods. As this service is not available elsewhere in the city, it is widely used by business firms

as well as by the general public and by servicemen away from home.

The Museum

All of the Museum collections which were removed in the spring of 1942 to a place of safekeeping outside the city for protection against air raids were returned in February, 1944. However, because of the reduction in the Museum staff, reinstallation of the materials has not yet been completed. Lack of adequate staff also compelled us to depart from our forty-year-old custom of keeping the Museum open evenings. It seems unlikely that this service will be resumed fully until after the end of the emergency, save that in the meantime special study groups can be accommodated by appointment. The members of the Museum Advisory Council, under the chairmanship of Mrs. Neville Booker, made conspicuous contributions of time and effort this past year in connection with the rearrangement of collections before and during the reinstallation of evacuated objects.

The same shortage in personnel precluded our usual special exhibition program, but through the extra efforts of those who remained, an interesting "off campus" exhibition of studies by American artists was held at the National Arts Club in Gramercy Park in February and proved to be the Museum's most important contribution of the past year to the city's art activities. Consisting entirely of Cooper Union Museum material, it featured drawings, water colors, oils, and pastels by such men as Winslow Homer, Thomas Moran, Robert Blum, Walter Clark, Frederick E. Church, William Chase, and Homer Martin. The many art-lovers who came to the Club went away more conscious of the vast importance of the Museum's collection.

Two important tasks are facing us and to both, during the past year, have been given much thought and preparation. The first is "reconversion" of those aspects of our educational program which were modified to meet war needs, and the second is long-range planning to meet postwar needs.

Since the School of Engineering was the division most disturbed by the war, its Faculty has been laying the groundwork well in advance of the end of the emergency for the admission of returned servicemen and for the reorganization of our curricula. Probably few engineering schools are as fortunate as ours in having been able to come through these three years of abnormal conditions with its teaching staff almost intact and with so relatively large a student body. It is interesting to compare its prewar budget with that of the year 1944-45 with respect to estimated student enrollment. Where many engineering schools have had to curtail sharply their staffs because of diminishing numbers of students, the Trustees of The Cooper Union have wisely refrained from dropping teachers because temporarily teaching loads are light. Although the student enrollment for the academic year 1944-45 is expected to be only about 414, or 32.1% of 1,286 (our last normal year's enrollment in 1941-42), the budgeted support of the School of Engineering for the next year is 83% of that of 1941-42. Thus by keeping the nucleus of the teaching staff reasonably close to normal during the war period, resumption of full teaching loads can be undertaken after the war with speed and efficiency, and with only minor additions to personnel.

The first reconversion plans to be effected by the Faculty of the School of Engineering will be the restor-

ing of our day courses to a two-semester basis, beginning in September, 1945. The task of the scheduling committee will be a difficult one, particularly since every effort will be made to cause as little dislocation as possible of normal individual student schedules.

In order to assist the reconversion effort of local industry and to remedy the condition of unusually small classes in the evening engineering courses, qualified industrial workers will be admitted to advanced subjects as special wartime participants. The Trustees have endorsed the recommendation of the Faculty that such men be admitted to individual courses for the coming year without the formality of the usual entrance examinations, provided they possess the necessary scholastic prerequisites and can show that they will profit by the instruction.

The problem of caring for the veterans who wish to enter the School of Engineering is a matter which demands our immediate and most sympathetic consideration. Leaves of absence granted to our own students who left to enter the armed forces were conditional on our ability to readmit them at the time of their return. On the other hand, it is our desire to handle all educational problems of the veterans with a minimum of red tape, delay, and uncertainty. Accordingly, on the recommendation of the Faculty, the Trustees approved the following policies with respect to the veteran:

(a) For the benefit of veterans who have not been previously admitted to the engineering courses of The Cooper Union, entrance examinations will be held in January as well as in August.

(b) Veterans who have been previously admitted to the engineering courses of The Cooper Union will not be required to take the entrance examinations.

(c) Veterans will not be subject to a restricted application period, but may make application at any time during the calendar year.

(d) For veterans who have had a year or more of scholastic training at the college level, provisional admission to an approved program of studies for review or credit may be made within a week of filing application, upon recommendation of the head of the engineering department in which they desire to register.

(e) Provisional admission will expire at the end of the academic year of 1944-45 and will not be subject to renewal. Consequently veterans who have not previously passed the entrance examinations must take and pass such tests in order to be admitted thereafter to any of the classes of the engineering courses.

(f) Should a veteran fail to pass the regular entrance examinations, he may take them again without restriction, but will not be given formal or informal admission to any class until he has so qualified.

(g) Veterans who have not had one year of scholastic training at the college level cannot be given provisional admission. However, if the number of such applicants who pass the January entrance examinations is deemed large enough, a special class may be established to permit the completion of a year's work in one or more first-year subjects during the second semester.

It is our hope and expectation that the veterans will be integrated into the academic and social life of the school as quickly as possible. We believe it would be a great mistake to regard them as a group apart from

their fellow students. To be sure, some veterans will have to be treated differently depending on the effect of their war experience on their minds and bodies, but they should be given every incentive and every facility to think and act as normal college students. Unfortunately they will probably be encouraged politically to acquire a certain amount of group consciousness and to exert pressure here and there for their own benefit and preferment. The colleges must be among the first civilian agencies to give voluntarily all the help and assistance that the veterans can possibly need in their readjustment to normal life, and to eliminate so far as possible the necessity as well as the desire for them to act as pressure groups.

With respect to improvements in administration and teaching now taking place which have a bearing on our future usefulness, three innovations may be mentioned which got under way this past year.

Our block plan of regrouping the day engineering curricula into a unit of basic science studies, followed by others devoted to basic engineering and advanced technology, was adopted by at least two other engineering colleges. While it is too soon to predict when the meaningless classifications of freshman, sophomore, junior, and senior years will be dropped, we at The Cooper Union are thinking of the progress of our students more and more in terms of the achievement of educational objectives rather than time served.

This block arrangement eventually will permit an evaluation of the student's progress and the prospects of his continuance. If such an evaluation shows that the student should not continue beyond the first block, he will have obtained certain educational values which qualify him for positions at the sub-engineering level. Likewise, at the end of the next block, students who have demon-

strated that they should no longer proceed with their engineering education will have acquired enough facility in some of the engineering subjects to fit them into non-professional positions in industry.

The evaluation will be on the basis of achievement tests which will measure ability to attack engineering problems and to solve them successfully. The day will soon be over, we hope, when educational progress is controlled by a sort of academic bookkeeping which "adds up" disparate and unrelated accomplishments. Advancement on the basis of achievement presupposes that, first of all, we have a clear idea of what we are expecting the student to achieve. Our Committee on Defining The Cooper Union Graduate is a first step in determining the specifications of our end product, on the basis of which we can establish the nature of our testing program.

Evidence of originality and resourcefulness in improving teaching techniques comes readily to hand. For instance, considerable improvement was made this past year in the teaching of physics by integrating lectures, class discussions, and laboratory periods so that during the progress of the course the student's knowledge is developed by these three approaches to a given phase of the subject matter, instead of having him listen to a discussion of general principles in the lecture hall, solve problems in the classroom, and perform experiments in the laboratory.

An innovation in laboratory procedures is the introduction of oral reports by individual students on their experiments. The aim is twofold—to help the student develop the ability to describe his work clearly and to enable him to learn what his colleagues have discovered, particularly in cases where varied experiments are used to demonstrate the same principles. At intervals during the year, three-hour laboratory sessions are

devoted to these reports, the students being encouraged to illustrate their talks with diagrams, charts, and lantern slides as well as scientific apparatus. Near the end of the year, each student selects a special problem for individual study on which he also reports orally. Besides revealing a student's findings, the oral report system compels each experimenter to achieve a thorough grasp of his subject so that he can not only speak interestingly and informatively on it, but answer whatever questions his fellow students may ask about it.

Among the first steps being taken to lay the groundwork for a revision of the four day curricula to bring them in line with the best current educational philosophies, with due attention to the recent SPEE report on "Engineering Education After the War" as well as to the current discussions within the staff, has been the organization of the Committee on Defining The Cooper Union Engineering Graduate, and its deliberations over the past year. The problem which this sub-committee of the Engineering Faculty has set for itself is the determination of those qualities and attributes which it feels should characterize the product of our four engineering curricula. From its deliberations so far three main groups have evolved, concerned with knowledge and understanding; abilities and skills; and attitudes and interests. Put in the form of questions, they ask: What information should the graduate possess? What kinds of abilities should he have? What skills should he possess? What basic attitudes or beliefs should he cherish? What should be the basic premises of his thinking and acting? What kinds of interests should he have?

The specifications set up after an analysis of these questions are to be met by the total experience of the student, that is, his intellectual and social maturity at admission, his formal college instruction, and his concurrent social development. It has been assumed that the

specifications of the desirable graduate must be sufficiently detailed to guide the postwar development of the curricula and to check the validity of our existing curricula and academic practices. In answering the question of what the end product or the objective of our engineering education is to be, we of the Faculty and Administration will have to determine first how the job is to be done and how well the job is being done. Out of this searching analysis and redefining of goals will come the basis for the revision of our day courses.

The Committee is a stimulating one, functioning under the leadership of Dr. Louis M. Heil, Head of the Department of Physics, and composed of representatives from all departments, including many younger members of the teaching staff.

To the department and division heads, to Dean Clark and Dean Bateman, and to Secretary Rehm, as well as to the continued generous support of the Trustees, and to the great personal interest, counsel, and cooperation of President Dunn, The Cooper Union is immeasurably indebted for whatever success it has achieved during the year just ended.

EDWIN SHARP BURDELL,
Director.